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(11) **EP 1 026 688 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
13.06.2001 Bulletin 2001/24

(51) Int Cl.7: **G11B 33/12**

(43) Date of publication A2:  
09.08.2000 Bulletin 2000/32

(21) Application number: **00300730.9**

(22) Date of filing: **31.01.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

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(30) Priority: **02.02.1999 US 243151**

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(54) **Removable integrated multiple internal disk drive subsystem**

(57) A computer system and a method of servicing the system utilize a disk drive array assembly (12) that can be internally installed into and removed from a host electronic casing (10) of the system as a single unit. The disk drive array assembly is an integrated single unit, housing a number of hard disk drives (18, 20, 22, 24 and 26). The disk drive array assembly can support a redundant inexpensive, or independent, disks (RAID) system. The disk drive array assembly is comprised of a disk cage (46), a backplane (16) and the hard disk drives. The disk cage and the backplane form an integrated housing unit (14 and 16) for the hard disk drives. The disk cage includes a number of tracks (50a, 50b, 52a, 52b, 54a, 54b, 56a, 56b, 58a and 58b), located on two lateral interior surfaces of the disk cage. Each track on one surface of the disk cage is laterally aligned to a track on the other surface. A pair of aligned tracks is designed to guide a single hard disk drive that is being inserted into the disk cage. In addition, the same pair of aligned tracks provides support for the disk drive after being inserted into the disk cage. The unitary design of the disk drive array assembly allows the disk drive array assembly to be transferred from one computer system to another computer system in an intact condition. Furthermore, the unitary design provides easy access to other electronic devices contained within the host electronic

casing, since the disk drive arrays assembly can be removed from the host electronic casing in the same intact condition.

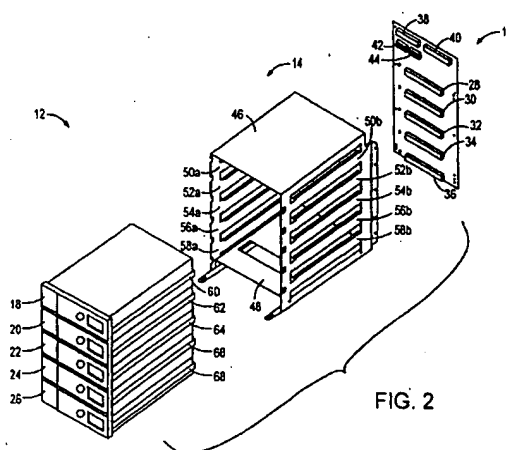


FIG. 2



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# EUROPEAN SEARCH REPORT

Application Number

EP 00 30 0730

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)	
X	US 5 822 184 A (RABINOVITZ JOSEF) 13 October 1998 (1998-10-13) * column 2, line 29 - column 5, line 52; figures *	1-10	G11B33/12	
X	WO 95 08911 A (CONNER PERIPHERALS INC) 30 March 1995 (1995-03-30) * page 5, line 9 - page 6, line 27 * * page 8, line 12 - page 14, line 35 * * page 16, line 34 - page 17, line 15; figures *	1-10		
A	US 5 515 515 A (KENNEDY BARRY ET AL) 7 May 1996 (1996-05-07) * column 3, line 47 - column 4, line 36; figures *	1-10		
A	US 5 777 845 A (KRUM RICHARD G ET AL) 7 July 1998 (1998-07-07) * abstract; figures *	1,7		
A	EP 0 653 759 A (TEAC CORP ;PONT PERIPHERALS CORP (US)) 17 May 1995 (1995-05-17) * abstract; figures *	1,7		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 5 398 158 A (FISHER JOHN G ET AL) 14 March 1995 (1995-03-14) * abstract; figures *	1,7		G11B
A	PATENT ABSTRACTS OF JAPAN vol. 018, no. 349 (P-1763), 30 June 1994 (1994-06-30) -& JP 06 084338 A (MITSUBISHI ELECTRIC CORP), 25 March 1994 (1994-03-25) * abstract; figures *	1,7		
The present search report has been drawn up for all claims				
Place of search		Date of completion of the search	Examiner	
THE HAGUE		23 April 2001	Declat, M	
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>				

EPO FORM 1503 03.82 (P04C01)



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Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 00 30 0730

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	WO 93 18517 A (DIGITAL EQUIPMENT CORP) 16 September 1993 (1993-09-16) * abstract; figures *	1,7	
A	EP 0 738 102 A (DIGITAL EQUIPMENT CORP) 16 October 1996 (1996-10-16) * abstract; figures *	1,7	
E	GB 2 341 715 A (SPRINGTEK LIMITED) 22 March 2000 (2000-03-22) * page 4, line 1 - page 7, line 28; figures *	1-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>23 April 2001</b>	Examiner <b>Declat, M</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/92 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 30 0730

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-04-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5822184 A	13-10-1998	NONE	
WO 9508911 A	30-03-1995	JP 9505418 T	27-05-1997
US 5515515 A	07-05-1996	NONE	
US 5777845 A	07-07-1998	NONE	
EP 0653759 A	17-05-1995	US 5483419 A JP 7254260 A	09-01-1996 03-10-1995
US 5398158 A	14-03-1995	AU 3827893 A GB 2266615 A,B JP 6012855 A ZA 9301831 A	04-11-1993 03-11-1993 21-01-1994 04-10-1993
JP 06084338 A	25-03-1994	NONE	
WO 9318517 A	16-09-1993	NONE	
EP 0738102 A	16-10-1996	DE 69604005 D DE 69604005 T US 5995377 A	07-10-1999 06-04-2000 30-11-1999
GB 2341715 A	22-03-2000	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82